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EXAMINER	
CHOW, LIXI	
ART UNIT	**PAPER NUMBER**
2652	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 10/043,970	Applicant(s) FASEN ET AL.	
	Examiner Lixi Chow	Art Unit 2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 2/18/05

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-11 and 13-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5-11, and 13- 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/28/05*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Response to Arguments

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 6-7, 9-11, 26, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Yagi et al.

Referring to Claim 1:

Yagi et al. discloses a movable system having capacitance-based position sensing, comprising:

a pair of objects, in the form of a first member (1) and a second member (2), an actuator (81 1-816) configured to effect an operative range of relative motion between the objects along an axis (column 7, Iines 64-67), and a capacitance-based position sensor including a first plate (B1-B3) secured to one of the objects, and a pair of second plates (A1-A3) secured to the other of the objects so that the second plates are adjacent and coplanar, and so that the second pîates are spaced from, and parallel to, the first plate as the objects move relative to one another along the axis (column 8, Iines 1-7), where the configuration of the first plate and the second plates results in two spaced- plate capacitors having capacitances that vary as the objects move relative to one another within the operative range along the axis (column 5, Iines 5-10), where the capacitance-based position sensor uses the capacitances to generate output usable to determine relative position of the objects along the axis (column 5, lines 1 1-16); where the capacitance-based position sensor is configured so that the output is substantially independent of

perpendicular spacing variations occurring between the first plate and each of the second plates (column 8, lines 63-65).

Claims 2, 3, 6, and 7 depend from Claim 1, and were not amended; therefore, they are rejected for the same reason as applied in the last Office Action.

Referring to Claim 9:

Yagi et al. disclose a sensor that outputs varying capacitance based upon changes in relative position along an axis between a pair of objects (figure 1), including a first plate (B1) secured to one of the objects, and a pair of second plates (A1 and A2) secured to the other of the objects so that the second plates are adjacent and coplanar and so that the second plates are spaced from and parallel to the first plate as the objects move relative to one another along the axis (column 4, lines 45-49), where the configuration of the first plate and second plates results in two (spaced-plate capacitors having capacitances that vary as the objects move relative to one another along the axis (column 5, lines 5-10), where the sensor uses the capacitances to generate output usable to determine relative position of the objects along the axis (column 5, lines 11-16); where the sensor is configured so that the output is substantially independent of perpendicular spacing variations occurring between the first plate and each of the second plates (column 8, lines 63-65).

Claims 10 and 11 depend from Claim 9, and were not amended; therefore, they are rejected for the same reason as applied in the last Office Action.

Referring to Claim 26:

Yagi et al. discloses a movable system having capacitance-based position sensing, comprising: a pair of objects (figure 6, element 1 and 2); an actuator configured to effect relative

motion between the objects along plural axes defining a plane (figure 6, elements 811-816); and a capacitance-based position sensor, including a first plate secured to one of the objects (A(1) corresponds to first plate); and a pair of second plates secured to the other of the objects so that the second plates are adjacent and coplanar (B(1) corresponds to second plates), and so that the second plates are spaced from, and parallel to, the first plate as the objects move relative to one another within the plane, where the configuration of the first plate and second plates results in two spaced-plate capacitors having capacitances that vary as the objects move relative to one another within the plane (see column 8, lines 1-8), where the capacitance-based position sensor uses the capacitances to generate output usable to determine relative position of the objects within the plane (see column 8, lines 17-19); where the capacitance-based position sensor is configured so that the output is substantially independent of perpendicular spacing variations occurring between the first plate and each of the second plates (see column 8, lines 61-67).

Referring to Claim 27:

Yagi et al. discloses a movable system having capacitance-based position sensing, comprising: a pair of objects (figure 6, element 1 and 2); an actuator configured to effect an operative range of relative motion between the objects along plural axes (figure 6, elements 811-816); and a capacitance-based position sensor, including a first plate secured to one of the objects (A(1) corresponds to first plate); and a pair of second plates secured to the other of the objects so that the second plates are adjacent and coplanar (B(1) corresponds to second plates), and so that the second plates are spaced from, and parallel to, the first plate as the objects move relative to one another along the plural axes (see column 8, lines 1-8), where the configuration of the first plate and second plates results in two space-plate capacitors having capacitances that vary as the

objects move relative to one another within the operative range along the plural axes, where the capacitance-based position sensor uses the capacitances to generate output usable to determine relative position of the objects along the plural axes (see column 8, lines 17-19).

3. Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Andermo (US/RE34,741), as applied in the last Office Action.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Kasnuki et al. (US 5,418,771).

Referring to Claims 14 and 25:

Kasanuki et al. disclose a sensor (Claim 14) and/or a movable system (Claim 25) that outputs varying capacitances based upon changes in relative position between a pair of objects (see Fig. 2, elements 104 and 101), comprising:

a first plate assembly configured to be fixed to one of the objects including plural first plates (see Fig. 3, element 110; Fig. 3 shows the simple configuration of a sensor, however, the configuration of capacitance plates in actual application is shown in Fig. 9 (see Col. 11, lines 53-59); therefore, element 801 in Fig. 9 also corresponds to first plate assembly); and

second and third plates assemblies configured to be fixed to the other of the objects, and second plate assembly including plural second plates, the third plate assembly including plural

third plates (see Fig. 3, element 120; or Fig. 9, element 802 and 803 correspond to second plate assembly and third plate assembly, respectively),

where the plate assemblies are configured so that total overlap between the first plates and the second plates, and the total overlap between the first plates and the third plates (see Figs. 3A-3C and 9), repeatedly increase and decreases as the objects translate relative to one another through an operative range of motion along an axis, such that a first plate of the first plate assembly simultaneously forms with each of second and third plates of each of the second and third plate assemblies, variable capacitors having capacitance that varies with relative positions of the objects (see Col. 11, line 62 to Col. 12, line 6).

Referring to Claim 15:

Kasanuki et al. disclose the sensor as in Claim 14, where the plate assemblies are configured to be secured to the objects so that, as the objects translate relative to one another through the operative range of motion along the axis, the first plates are parallel to and spaced perpendicularly from both the second plates and the third plates (see Figs. 2 and 3A-3C).

Referring to Claim 16:

Kasanuki et al. disclose the sensor of Claim 14, where the plate assemblies are configured to be secured to the objects so that, as the objects translate relative to one another through the operative range of motion along the axis, the first plates are coplanar (see Figs. 2 and 3A-3C; first plates correspond the element 110; or Fig. 9, element 801); and

the second plates are coplanar and spaced perpendicularly from the first plates (see Figs. 2 and 3A-3C; and Fig. 9, elements 802 corresponds to second plates); and

the third plates are coplanar and spaced perpendicularly from the first plates (see Figs. 2 and 3A-3C; and Fig. 9, element 803 corresponds to third plates).

Referring to Claim 17:

Kasanuki et al. discloses the sensor as in Claim 14, where the second and third plates are interleaved, such that one of the second plates is positioned between each pair of neighboring third plates (see Fig. 9).

Referring to Claim 18:

Kasanuki et al. disclose the sensor as in Claim 18, where the plate assemblies are configured so that, as the objects translate relative to one another through the operative range of motion along the axis, the total overlap between the first plates and the second plates varies inversely with the total overlap between the first plates and the third plates (see Fig. 9, as element 801 move along the x (y) direction, the overlap between the first plates and the second plates and between the first plates and the third plates are inversely related).

Referring to Claim 19:

Kasanuki et al. disclose the sensor as in Claim 14, where the plate assemblies are configured so that, as the objects translate relative to one another through the operative range of motion along the axis, the capacitance produced between the first plates and the second plates varies inversely with the capacitance produced between the first plates and the third plates (see Fig. 9, as element 801 move along the x (y) direction the capacitance produced between the first plates and second plates; and first plates and third plates are inversely related; also see Figs. 10A and 10B).

Referring to Claim 20:

Kasanuki et al. disclose the sensor as in Claim 14, where the variable capacitors form part of a capacitance-measuring circuit configured to produce, in response to application of an input to at least one of the plate assemblies, an output based upon capacitance between the first plates and the second plates, and between the first plates and the third plates (see Col. 6, lines 60 to Col. 7, lines 4).

Referring to Claim 21:

Kasanuki et al. disclose the sensor as in Claim 20, where the capacitance-measuring circuit is configured so that the output is substantially independent of perpendicular spacing variation occurring between the first plates and the second plates, and between the first plates and the third plates (see Col. 9, lines 17-45).

Referring to Claim 22:

Kasanuki et al. disclose the sensor as in Claim 20, where the capacitance-measuring circuit is configured to apply a time-varying input signal to the second plate assembly, and to apply an inversion of the time-varying input signal to the third plate assembly, in order to produce the output (see Col. 5, line 52 to Col. 6, lines 4; Kasanuki et al. show that time-varying input signals (oscillation signal) are transmitted to each set of electrodes or plates to generate magnitude of capacitive coupling of the upper and lower electrodes; it is inherent that a inversion of the time-varying input signal is apply to the third plate assembly, so that magnitude of the capacitive coupling between the upper and lower electrodes can be use to detect the relative position between object 101 and object 104).

Referring to Claim 23:

Kasanuki et al. disclose the sensor as in Claim 22, where the time-varying input signal is sinusoidal, and where the inversion of the time-varying signal is produced through a phase shift of the sinusoidal time-varying input signal (see Col. 5, line 52 to Col. 6, lines 4; oscillation signal corresponds to sinusoidal; it is inherent that the inversion of the time-varying signal is produced through a phase shift of the sinusoidal time-varying input signal).

Referring to Claim 24:

Kasanuki et al. disclose the sensor as in Claim 14, where the first plate assembly is configured to be operatively secured to one of the a computer-readable storage medium and an enclosure within which the storage medium is mounted, and where the second and third plate assemblies are configured to be operatively secured to the other of the storage medium and enclosure, the sensor thus being configured to output varying capacitance base upon changes in relative position between the storage medium and enclosure (see Fig. 2; and first plate assembly 110 of Fig. 2 or 801 of Fig. 9 is secured to the enclosure; the second and third plated assemblies 120 of Fig. 2 or 802 and 803 of Fig. 9 are secured to the storage medium, which is the recording medium chip 101 that contains recording medium 102).

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yagi et al. in view of Andermo (US/RE34,741).

Referring to Claim 5:

Yagi et al. disclose a movable system having capacitance-based position sensing, comprising:

a pair of objects (figure 1A, element 1 and 2);

an actuator configured to effect an operative range of relative motion between the objects along an axis (figure 1A and 1B, the element 2 shown in figure 1A is moving along the x-aixs); and

a capacitance-based position sensor, including a first plate secured to one of the objects (figure 1, element B is secured to element 2); and

a pair of second plates secured to the other of the objects so that the second plates are adjacent and coplanar (figure 1, element A is secured to element 1), and so that the second plates are spaced from, and parallel to, the first plate as the objects move relative to one another along the axis, where the configuration of the first plate and second plates results in two spaced-plate capacitor having capacitances that vary as the objects move relative to one another within the operative range along the axis (see column 5, lines 5-10), where the capacitance-based position sensor uses the capacitance to generate output usable to determine relative position of the object along the axis (see column 5, lines 11-16).

Yagi et al. do mention that the detection of displacement is not affected by the changes in the spacing variation between the first plate and each of second plates; however, Yagi et al. do not mention of output-input transfer function. On the other hand, Andermo discloses a modification of the geometry of the first plate, thereby inherently modifying the transfer function, to significantly reduce the effects of perpendicular spacing variation, or tilt, occurring

as a result of the pairs of objects moving relative to one another (see Andermo, column 7, lines 33-36).

It would have been obvious to one skilled in the art at the time the invention was made to modify the movable system with the capacitance measuring circuit sensor as taught by Yagi et al. with the uses of the geometry medication to improve the transfer function as taught by Andermo in order to allow capacitance-type devices to be constructed with less mechanical tolerances and enable production of less expensive devices while maintaining an improved level of accuracy (column 7, lines 49-53).

Referring to Claim 13:

Yagi et al. disclose a sensor that outputs varying capacitance based upon changes in relative position along an axis between a pair of objects (figure 1A, element 1 and 2), comprising:

a first plate secured to one of the objects (figure 1A, element B is secured to element 2); and

a pair of second plates secured to the other of the objects (figure 1A, element A is secured to element 1) so that the second plates are adjacent and coplanar, and so that the second plates are spaced from and parallel to the first plates as the objects move relative to one another along the axis, where the configuration of the first plate and second plates results in two-spaced-plate capacitors having capacitance that vary as the objects move relative to one another along the axis (see column 5, lines 5-10), where the sensor uses the capacitances to generate output usable to determine relative position of the objects along the axis (see column 5, lines 11-16).

Yagi et al. do mention that the detection of displacement is not affected by the changes in the spacing variation between the first plate and each of second plates; however, Yagi et al. do not mention of output-input transfer function. On the other hand, Andermo discloses a modification of the geometry of the first plate, thereby inherently modifying the transfer function, to significantly reduce the effects of perpendicular spacing variation, or tilt, occurring as a result of the pairs of objects moving relative to one another (see Andermo, column 7, lines 33-36).

It would have been obvious to one skilled in the art at the time the invention was made to modify the movable system with the capacitance measuring circuit sensor as taught by Yagi et al. with the uses of the geometry medication to improve the transfer function as taught by Andermo in order to allow capacitance-type devices to be constructed with less mechanical tolerances and enable production of less expensive devices while maintaining an improved level of accuracy (column 7, lines 49-53).

7. Applicant's arguments filed 2/18/05 have been fully considered but they are not persuasive.

Claim 1 is amended to include the limitation that was in original Claim 4. Hence the amended Claim 1 is rejected as being anticipated by Yagi et al. as applied in the last Office Action. Applicant argued that Yagi et al. does not disclose a "capacitance-based position sensor is configured so that the output is substantially independent of perpendicular spacing variations occurring between the first plate and each of the second plates"; however, on column 8, lines 61-67, Yagi et a. clearly pointed out that changes in the spacing between the first plates and the second plates will not affect the detection of position displacement. Applicant suggests the cited

language indicates otherwise and states that "In fact, spacing variation between the first plates and each of the second plates in Yagi et al. will affect the current, and thus will affect detection of displacement". Such statement contradicts what is being disclosed in Yagi et al.'s reference. Furthermore, the cited language is found under the "Advantages provided by the invention includes". Evidently, Yage et al invention would benefit from the fact that even when spacing between the first plates and second plates varies, the output or detection of the displacement is not affected. Also, Applicant argued that Yagi et al. fail to discloses "variation from the first plate to each of second plates (e.g. where the spacing between the first plate and the second plate A is different than the spacing between the first plate and the second plate B)". However, amended Claim 1 does not recite the limitation on the spacing differences between first plate and second plate A; and first plate and second plate B. Therefore, Yagi et al. satisfy all the limitations that are recited in Claim 1.

Claim 9, like Claim 1, is amended to include the limitation that was in the original Claim 12. Hence the amended Claim 9 is rejected as being anticipated by Yagi et al. as applied above.

In regards to Claim 8, Applicant argued, "Although the geometry of the end portions of the transmitter electrode array 310 (or the detector electrode 320) is modified, such modification is made to address tilt, not to produce an output-input transfer function..." Applicant must note that tilting of the capacitor plates generate spacing variations between the plates. It is inherent that the movable system of Andermo yields an output-input transfer function that is substantially independent of spacing variations between the first plate and each of the second plates. Since Andermo shows the output is not affected by the space variations of the plates, then output-input transfer function is also not affected by the spacing variation of the plates.

Applicant also argued that neither Yagi et al. and Andermo recite "where the spacing between the first plate and second plate A is different than the spacing between the first plate and second plate B". However, such limitation is not recited in Claim 5 or Claim 13.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lemkin et al. and Hartwell et al. are cited, because they both show position sensing using capacitor plates secured to objects.

9. Applicant amended independent Claims 14 and 25; therefore necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lixi Chow whose telephone number is 571-272-7571. The examiner can normally be reached on Mon-Fri, 8:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LC 7/5/05

William J. Klimowicz

WILLIAM KLIMOWICZ
PRIMARY EXAMINER